

separately, and corresponding user inputs generated for the users based on the changes in pose of their associated objects. Generally, users are expected hold the object in front of them, and so associating each object with a corresponding user may involve detecting a given object as being located in front of a given user. As will be appreciated, in some examples, this may involve obtaining depth information such that a relative distance of each object from a given user can be estimated.

**[0102]** In some examples, computer software having computer executable instructions is provided, which, when executed by a computer cause the computer to perform any of the previously described method steps. This computer software may be stored at a non-transitory, machine-readable storage medium.

**[0103]** It will be appreciated that example embodiments can be implemented by computer software operating on a general-purpose computing system such as a games machine. In these examples, computer software, which when executed by a computer, causes the computer to carry out any of the methods discussed above is considered as an embodiment of the present disclosure. Similarly, embodiments of the disclosure are provided by a non-transitory, machine-readable storage medium which stores such computer software.

**[0104]** It will also be apparent that numerous modifications and variations of the present disclosure are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the disclosure may be practised otherwise than as specifically described herein.

**[0105]** Embodiments of the present disclosure may be implemented according to any one (or more) of the following numbered clauses:

1. A system for generating video game inputs, the system comprising:

**[0106]** an input unit operable to obtain images of a passive non-luminous object being held by a user;

**[0107]** an object detector operable to detect the passive non-luminous object being held by the user in the obtained images;

**[0108]** wherein the object detector is configured to detect an area in the image corresponding to the passive non-luminous object based on the pixels corresponding to the object and not based on a physical identifier that has been added to the object;

**[0109]** an object pose detector operable to detect changes in pose of the passive non-luminous object based on the obtained images of the object;

**[0110]** wherein the object pose detector is configured to detect the pose of the passive non-luminous object based on at least one of (i) a contour detection operation and (ii) the output of a machine learning model that has been trained to detect the poses of passive non-luminous objects in images; and

**[0111]** a user input generator operable to generate a user input based on detected changes in the pose of the passive non-luminous object, and to transmit an indication of the generated user input to a video game unit executing an instance of a video game, so as to update the display of a virtual object in the video game in accordance with the generated user input.

2. A system according to clause 1, wherein the object detector is configured to detect a contour in the obtained

images corresponding to a periphery of the passive non-luminous object that is being held by the user; and

**[0112]** wherein the object pose detector is configured to detect changes in pose of the passive non-luminous object based on changes in least one of the orientation, position and area of the contour in the obtained images.

3. A system according to clause 2, wherein the user input generator is configured to generate different respective user inputs based on whether the orientation, position and area of the contour is detected as changing in the obtained images.

4. A system according to clause 2 or clause 3, wherein the object detector is configured to detect a plurality of contours in the obtained images, and to identify the largest contour as corresponding to the passive non-luminous object being held by the user.

5. A system according to any of clauses 2 to 4, wherein the object detector is configured to obtain colour information indicating a pre-determined colour of the passive non-luminous object that a user is or intends to hold; and

**[0113]** wherein the object detector is configured to filter one or more colours not corresponding to the pre-determined colour from the obtained images, prior to performing the contour detection.

6. A system according to any preceding clause, wherein the input unit is configured to obtain images of at least two passive non-luminous objects being held by a user;

**[0114]** wherein the object detector is configured to detect respective contours corresponding to the at least two passive non-luminous objects in the obtained images, and determine a respective location within the image representation of each object;

**[0115]** wherein the object pose detector is configured to detect a change in pose of the at least two passive non-luminous objects based on changes in orientation of a line joining the detected locations; and

**[0116]** wherein the user input generator is operable to generate a directional user input so as to control a direction in which the virtual object is travelling in the video game, and to transmit the generated user input to the video game unit.

7. A system according to clause 6, wherein object detector is configured to determine a respective location within the image representations of each object by calculating an image moment for the pixels within the contours detected for each non-luminous object so as to determine a point or region that is representative of the centre of each object.

8. A system according to clause 6 or clause 7, wherein the object detector is configured to detect at least two contours associated with each passive non-luminous object being held by the user;

**[0117]** wherein the object detector is configured to generate a linear representation of each object based on the contours associated with that object; and

**[0118]** wherein the object pose detector is configured to detect a change in pose of the at least two non-luminous objects based on changes in orientation of a line intersecting the linear representations generated for each object.

9. A system according to any of clauses 6 to 8, wherein the object pose detector is configured to detect whether the distance between the locations detected for each object is less than a threshold distance; and

**[0119]** wherein the user input generator is configured to generate a user input corresponding to a change in control mode in response to receiving an input from the object pose